

Third Grade Mathematics

By the end of grade three, students develop understandings of multiplication and division of whole numbers. They use properties to develop increasingly more sophisticated strategies to solve problems involving basic multiplication and division facts. They relate division to multiplication. Students understand fraction equivalence for simple fractions; they recognize that the size of a fractional part is relative to the size of the whole. They understand meanings of fractions to represent parts of a whole, parts of a set, or distances on a number line. They compare and order simple fractions by using models, benchmark fractions, or common denominators.

Students investigate, analyze, and classify two-dimensional shapes by their sides and angles. They decompose, combine, and transform polygons to understand properties of two-dimensional space and use those properties to solve problems. Students construct and analyze frequency tables, bar graphs, picture graphs, and line plots and use them to solve problems.

Standard I: Students will understand the base-ten numeration system, place value concepts, simple fractions and perform operations with whole numbers.

Objective 1: Represent whole numbers up to 10,000, comprehend place value concepts, and identify relationships among whole numbers using base-ten models and symbolic notation.

- a. Read, write, and represent whole numbers using standard and expanded form.
- b. Demonstrate multiple ways to represent numbers using models and symbolic representations (e.g., fifty is the same as two groups of 25, the number of pennies in five dimes, or $75 - 25$).
- c. Identify the place and the value of a given digit in a four-digit numeral and round numbers to the nearest ten, hundred, and thousand.
- d. Order and compare whole numbers on a number line and use the symbols $<$, $>$, \neq , and $=$ when comparing whole numbers.
- e. Identify factors and multiples of whole numbers.

Objective 2: Use fractions to describe and compare parts of the whole.

- a. Identify the denominator of a fraction as the number of equal parts of the unit whole and the numerator of a fraction as the number of equal parts being considered.
- b. Define regions and sets of objects as a whole and divide the whole into equal parts using a variety of objects, models, and illustrations.
- c. Name and write a fraction to represent a portion of a unit whole for halves, thirds, fourths, sixths, and eighths.
- d. Place fractions on the number line and compare and order fractions using models, pictures, the number line, and symbols.
- e. Find equivalent fractions using concrete and pictorial representations.

Objective 3: Model problems involving addition, subtraction, multiplication, and division.

- a. Demonstrate the meaning of multiplication and division of whole numbers through the use of a variety of representations (e.g., equal-sized groups, arrays, area models, and equal jumps on a number line for multiplication, partitioning and sharing for division).
- b. Use a variety of strategies and tools, such as repeated addition or subtraction, equal jumps on the number line, and counters arranged in arrays to model multiplication and division problems.
- c. Demonstrate, using objects, that multiplication and division by the same number are inverse operations (e.g., $3 \times \square = 12$ is the same as $12 \div 3 = \square$ and $\square = 4$).
- d. Demonstrate the effect of place value when multiplying whole numbers by 10.
- e. Write a story problem that relates to a given addition, subtraction, or multiplication equation, and write a number sentence to solve a problem related to the students' environment.

Objective 4: Compute and solve problems involving addition and subtraction of 3- and 4-digit numbers and basic facts of multiplication and division.

- a. Use a variety of methods to facilitate computation (e.g., estimation, mental math strategies, paper and pencil).
- b. Find the sum or difference of numbers, including monetary amounts, using models and strategies such as expanded form, compensation, partial sums, and the standard algorithm.
- c. Compute basic multiplication facts (0-10) and related division facts using a variety of strategies based on properties of addition and multiplication (i.e., commutative, associative, identity, zero, and the distributive properties).

Mathematical Language and Symbols Students Should Use

sum, difference, expanded form, factor, product, array, multiple, numerator, denominator, halves, thirds, fourths, sixths, eighths, divisor, dividend, quotient, greater than, less than, equal to, $<$, $>$, $=$

Exploratory Concepts and Skills

- ✓ Extend multiplication and division to larger-digit numbers.
- ✓ Use concrete objects and visual models to add and subtract common decimals.
- ✓ Investigate the distributive property of multiplication over addition for single-digit multipliers (e.g., 7×15 is equivalent to $7 \times (10 + 5)$ is equivalent to $(7 \times 10) + (7 \times 5)$).

Standard II: Students will use patterns, symbols, operations, and properties of addition and multiplication to represent and describe simple number relationships.

Objective 1: Create, represent, and analyze growing patterns.

- a. Create and extend growing patterns using objects, numbers, and tables.
- b. Describe how patterns are extended using manipulatives, pictures, and numerical representations.

Objective 2: Recognize, represent, and simplify simple number relationships using symbols, operations, and properties.

- a. Represent numerical relationships as expressions, equations, and inequalities.
- b. Solve equations involving equivalent expressions (e.g., $6 + 4 = \Delta + 7$).
- c. Use the $>$, $<$, and $=$ symbols to compare two expressions involving addition and subtraction (e.g., $4 + 6 \square 3 + 2$; $3 + 5 \square 16 - 9$).
- d. Recognize and use the commutative, associative, distributive, and identity properties of addition and multiplication, and the zero property of multiplication.

Mathematical Language and Symbols Students Should Use

growing patterns, expressions, equations, $<$, $>$, $=$

Exploratory Concepts and Skills

- ✓ Use concrete materials to build an understanding of equality and inequality.
- ✓ Explore properties of equality in number sentences (e.g., when equals are added to equals, then the sums are equal; when equals are multiplied by equals, then the products are equal).

Standard III: Students will describe and analyze attributes of two-dimensional shapes.**Objective 1: Describe and compare attributes of two-dimensional shapes.**

- a. Identify, describe, and classify polygons (e.g., pentagons, hexagons, octagons).
- b. Identify attributes for classifying triangles (e.g., two equal sides for the isosceles triangle, three equal sides for the equilateral triangle, right angle for the right triangle).
- c. Identify attributes for classifying quadrilaterals (e.g., parallel sides for the parallelogram, right angles for the rectangle, equal sides and right angles for the square).
- d. Identify right angles in geometric figures, or in appropriate objects, and determine whether other angles are greater or less than a right angle.

Objective 2: Demonstrate the meaning of congruence through applying transformations.

- a. Demonstrate the effect of reflection, translation, or rotation using objects.
- b. Determine whether two polygons are congruent by reflecting, translating, or rotating one polygon to physically fit on top of the other.

Mathematical Language and Symbols Students Should Use

polygon, attribute, quadrilateral, equilateral triangle, isosceles triangle, right triangle, pentagon, hexagon, octagon, parallel, right angle, reflect, translate, rotate, slide, flip, turn, congruent

Exploratory Concepts and Skills

- ✓ Explore line symmetry and rotational symmetry.
- ✓ Investigate two-dimensional representations of three-dimensional objects.

Standard IV: Students will select and use appropriate units and measurement tools to solve problems.

Objective 1: Select and use appropriate tools and units to estimate and measure length, weight, capacity, time, and perimeter of two-dimensional figures.

- a. Describe the part-whole relationships (e.g., 3 feet in a yard, a foot is $\frac{1}{3}$ of a yard) between metric units of length (i.e., centimeter, meter), and among customary units of length (i.e., inch, foot, yard), capacity (i.e., cup, quart), and weight (i.e., pound, ounce).
- b. Measure the length of objects to the nearest centimeter, meter, half- and quarter-inch, foot, and yard.
- c. Measure capacity using cups and quarts, and measure weight using pounds and ounces.
- d. Identify the number of minutes in an hour, the number of hours in a day, the number of days in a year, and the number of weeks in a year.
- e. Describe perimeter as a measurable attribute of two-dimensional figures, and estimate and measure perimeter with metric and customary units.

Objective 2: Solve problems involving measurements.

- a. Determine simple equivalences of measurements (e.g., 30 inches = 2 feet and 6 inches; 6 cups = $1\frac{1}{2}$ quarts; 90 min. = 1 hr. 30 min.).
- b. Compare given objects according to measurable attributes (i.e., length, weight, capacity).
- c. Solve problems involving perimeter.
- d. Determine elapsed time in hours (e.g., 7:00 a.m. to 2:00 p.m.).

Mathematical Language and Symbols Students Should Use

measure, unit, metric system, customary system, length, pound, ounce, centimeter, meter, inch, foot, yard, capacity, weight, perimeter

Exploratory Concepts and Skills

- ✓ Determine the value of a combination of coins and bills.
- ✓ Count back change from a single purchase.

Standard V: Students will collect and organize data to make predictions and identify basic concepts of probability.

Objective 1: Collect, organize, and display data to make predictions.

- a. Collect, read, represent, and interpret data using tables, graphs, and charts, including keys (e.g., pictographs, bar graphs, frequency tables, line plots).
- b. Make predictions based on a data display.

Objective 2: Identify basic concepts of probability.

- a. Describe the results of events using the terms “certain,” “likely,” “unlikely,” and “impossible.”
- b. Conduct simple probability experiments, record possible outcomes systematically, and display results in an organized way (e.g., chart, graph).
- c. Use results of simple probability experiments to describe the likelihood of a specific outcome in the future.

Mathematical Language and Symbols Students Should Use

data, table, chart, graph, frequency table, line plot, pictograph, bar graph, likely, certain, outcome, impossible outcome

Exploratory Concepts and Skills

- ✓ Predict outcomes of simple experiments.